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again and carried forward his history of the English Revolution; he composed and issued several volumes of Memoirs relating to his own time; he collected and edited his parliamentary speeches; and he published or republished other writings, — among them, some volumes of Meditations on the Christian religion. His political sceptre was broken; but in the elect circle of the French Academy (of which since 1836 he had been a member) he found room to exert the controlling will that the changing fortunes of eighty years had not been able to break; and in the Protestant Consistory he led with characteristic energy the opposition to the latitudinarian tendencies of the day.

Guizot's last years were spent mostly in his country home at Val Richer in patriarchal and dignified simplicity. The traits of his character shone in the light of old age. One of his last interests was "the paternal pleasure of relating the history of France," as he said, "to my grandchildren," — with no view, however, to publication. This narrative he lived to carry a great deal lower than the period covered by his lectures on the history of Civilization in France. When publication was asked and granted, he took formal occasion to affirm his historical creed by emphasizing what he deemed the two factors of all history: "L'histoire a des lois qui lui viennent de plus haut; mais les hommes sont, dans l'histoire, des êtres actifs et libres, qui y produisent des résultats et exercent une influence dont ils sont responsables."

SIR CHARLES LYELL.

Fortunate alike in his genius and his circumstances, Sir CHARLES LYELL was one of the few eminent cultivators of modern science who had not lived to see in his old age the work of his youth and his prime superseded or surpassed in the rapid advance in the knowledge of nature that distinguishes our time. Entering on his career at a period when every thing was prepared for the impulse of a master-mind, he determined that movement of progress in geology which is one of the greatest achievements of our century; and throughout a long life he maintained that position of direction and command to which his superior sagacity guided him at an early age, and which his superior ability secured. The influence of Bacon's teaching, which related rather, or more directly in effect, to the social and religious standing or respectability of scientific pursuits and theories, than to any real guidance in scientific method, had prepared the world, and especially the English-speaking world, for that consideration of heterodox views, and that toleration of novelties in science, with which the last century ended. The physical sciences had just made a wonderful advance from the impulse first given about two centuries before by the genius of Galileo. The fierce disputes of the eighteenth century about geological hypotheses had nearly died out. These hypotheses had, at least, ceased to be regarded by the best minds as dogmas to be opposed or defended, and had come to be considered in the light of questions put to nature; to be decided only by that patient thoughtfully directed labor of research in which an army of explorers became engaged and which they still pursue. Genius, in such circumstances and with such co-operation, does not stand forth in history with so conspicuous an eminence as when appearing alone or in conflict with the prejudices of its times. That feature of genius, energy of will and character, which strikes us most in its most conspicuous examples, is thus made to appear to be its leading characteristic. The subtlety of perception, the sagacity or wisdom, which guides the energies of genius, and is their determining motive, appears thus in an illusively disproportionate degree. Though less conspicuously, therefore, than many other names in science, yet not any less inseparably connected with its advance, is the name of Sir Charles Lyell associated with the progress of a great revolution in geology.

The separation of geological questions from scholastic disputes, and the establishment of the science as a strictly inductive one, are in a great measure to be credited to the early, clear, and steady conception of true method, which Sir Charles Lyell's works expounded, and were admirably designed to promulgate. For more than forty years they have been the text-books of the progressive school of geology; keeping pace in their successive editions with the progress of the science, and being thus, as it were, compends of its history. The "Elements of Geology," of which seven editions were published, the last in 1871, was a strictly descriptive treatise in accordance with the principles of Baconian induction. But not so his masterpiece, the "Principles of Geology." So far from being of a Baconian type, this work takes its form and spirit from the genius of Galileo. Of modern students of nature whose preparatory training has not included an adequate discipline in mathematical and experimental research, many have committed the error of extending their dislike of the *a priori* and deductive methods of scholastic philosophy, and of more ancient explanations of nature, to all use of deduction in natural science. But the *axiomata media* of Bacon, the middle principles, which constitute in any science its characteristic value, are vainly sought, except in the most abstract sciences, by the direct Baconian methods of induction. They are really derived deductively, though only after the broader principles have been independently established by induction. But this can be safely done only after the lowest or merely descriptive generalizations have presented the problems and the tests, between which and the highest generalizations explanatory connections are sought by the deductions and verifications of physical science.

A far more intimate actual acquaintance than Bacon even dreamt of with the principles of physical causation had been attained in dynamical science, and was familiar to many students of geology during the eighteenth century; principles which are almost as remote from the science of Bacon's time as from that of Aristotle's. These principles, and the examples of their application to the explanation of natural phenomena, gave a direction to the inquiries of geologists which was naturally enough looked upon as rash in speculation, and even irreverent in spirit, by all who did not share in the insight of these thinkers. The possibility of explaining the phenomena of the earth's formations by means of the causes in actual and normal operations, and not any disrespect for miraculous causes, but a preference for the explanations which to their trained imaginations appeared possible, "without violence, without fictions, without hypotheses, without miracles," determined the theories of the uniformitarians, and especially those of Hutton and his school. The very conception of geology as a branch of physical science, and as allied with Newtonian astronomy, physical geography, and meteorology, divided it sharply from the cosmological speculations which, without foundation in inductions, had previously served as principles of explanation in this science. Hutton was the first to declare that geology is in no wise concerned with questions as to the origin of things. But the very name "origin" had to be converted from its familiar absolute meaning, as a synonyme of miraculous creation, to its meaning in modern science, that of natural production. The revolution about to take place in geology was first clearly apparent to those thinkers who were familiar with and trained in the applications of dynamical principles to the explanation of natural phenomena, not only in the regularities and recurrences of these phenomena, but also in the gradual changes, and the progressions in their conditions, which these principles implied. Playfair's illustrations of Hutton's theories were studies undertaken in the spirit of this philosophy. But as yet the lower and merely descriptive facts of the science were far too few and incomplete to afford definite problems or decisive tests of theory. Playfair's work was published in 1797, the year in which Lyell was born. Ten years later, in 1807, the Geological Society of London was founded. This, like other modern scientific societies, was devoted to the Baconian cultivation of science, or to furnishing a broad inductive basis for the future constitution of geology, and was principled against the premature speculation of the middle principles and explanations of the science. In this society no discussions of "theories of the earth" were in order.

But there already existed a body of facts in the current physical history of the globe, bearing on questions of origin, which needed only to be revised and augmented to serve for subsequent legitimate deductions in geology. The genius of Lyell was first turned to this field of research; and in the year 1832 the first fruits of his labor appeared in the earliest edition of his "Principles of Geology." Eleven editions of this work have been published, the last in 1872. In 1836–37, Lyell was chosen President of the Geological Society. A few years later, 1841–42, he visited the United States for geological observations; and again for social as well as geological studies in 1845–46. Narratives of these visits were soon afterwards published by him. He was again made President of the Geological Society in 1850–51.

Notwithstanding Lyell's early and clear perception of true method in natural science, he was by no means free at first, nor for a long time, from surviving conceptions of scholastic speculation, especially in his treatment of the biological division of geology; and he shared in the reaction, which extended to nearly every department of thought, of the present century against the freedom of speculation in the eighteenth. Deference to the high authority of Linnæus and Cuvier in the systematic sciences of natural history made him accept, as warranted by their observations, the doctrine of the immutability of species, which as a positive doctrine they had really derived implicitly from the scholastic meaning of the term species. His opposition to the transmutation theory of Lamarck was distinguished, however, from that of most of its opponents by a fair and judicial consideration of the arguments. But real and positive evidence on this subject had during a half century slowly accumulated; and many merely negative facts, defaults of evidence, which had been positively construed in accordance with current scholastic conceptions, were giving place to facts of a Baconian force and validity; and Lyell was foremost among the opponents of the transmutation theory to appreciate their significance. His treatise on "The Geological Evidences of the Antiquity of Man, with Remarks on Theories of the Origin of Species by Variation," appeared in 1863, four years after the first edition of Darwin's "Origin of Species." Three years later, in 1866, in the tenth edition of his "Principles," a complete revision of his discussion of the development theory, abandoning the positions he had previously held, removed from this, his master-piece, its sole blemish; and gave to it a logical completeness, and an entire accordance with the physical principles, the types of its method, which it had previously lacked. And thus it happened that Lyell was one of the few veterans in science who relinquished their earlier views in consequence of the arguments and the facts in Darwin's "Origin of Species," and in his treatise on "The Variation of Animals and Plants under Domestication."

Both the earlier and this later position of Sir Charles Lyell on the transmutation theory were consequences of worthy traits of mind and character. He was "in nothing too much;" was cautious from the conservatism of a Liberal, and was not conservative through any taint of servility. A liberal in politics and religion as well as in science, he was deeply interested in the political conditions and social characteristics of America, where during his two visits he won to him the attachment of many life-long friends. His wife, a lady of rare gifts, the daughter of a distinguished geologist, Mr. Leonard Horner, was the constant companion of Sir Charles Lyell in his travels and studies. Bereft two years before by the death of this devoted friend, he died on the 22d of last February at the age of seventy-seven. He was a native of Scotland, the eldest son of Charles Lyell, Esq., of Kinordy, County Forfar. He was graduated at Oxford in 1821, and was called to the bar. He was knighted in 1848, and created a baronet in 1864. His scholarly attainments and a judicial spirit of accuracy, the results of his training, conduced not less than his native sagacity, patience, and amiability, to win for him the illustrious place which his name will ever hold in the history of science.

Since the last Annual Meeting the Academy has received an accession of twenty-one new members: eight Fellows, five Associate Fellows, and eight Foreign Honorary Members.

The list of the Academy, including 195 Fellows, 91 Associate Fellows, 70 Foreign Honorary Members, is hereto added: —